

# National Drug Service Organization: Analysis of Markups, Income, and Costs, 2007–2012

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June 2013



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The goal of the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program is to assure the availability of quality pharmaceutical products and effective pharmaceutical services to achieve desired health outcomes. Toward this end, the SIAPS result areas include improving governance, building capacity for pharmaceutical management and services, addressing information needed for decision-making in the pharmaceutical sector, strengthening financing strategies and mechanisms to improve access to medicines, and increasing quality pharmaceutical services.

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Systems for Improved Access to Pharmaceuticals and Services  
Center for Pharmaceutical Management  
Management Sciences for Health  
4301 North Fairfax Drive, Suite 400  
Arlington, VA 22203 USA  
Telephone: 703.524.6575  
Fax: 703.524.7898  
E-mail: [siaps@msh.org](mailto:siaps@msh.org)  
Website: [www.siapsprogram.org](http://www.siapsprogram.org)

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## ACRONYMS AND ABBREVIATIONS

ART	antiretroviral therapy
ARV	antiretroviral
CHAL	Christian Health Association of Lesotho
FY	financial year
GOL	Government of Lesotho
LSL	Lesotho loti (maloti)
MOH	Ministry of Health
MOHSW	Ministry of Health and Social Welfare
MSH	Management Sciences for Health
NDSO	National Drug Service Organization
PMTCT	prevention of mother-to-child transmission
SIAPS	Systems for Improved Access to Pharmaceuticals and Services
SPS	Strengthening Pharmaceutical Systems
USAID	US Agency for International Development

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### National Drug Service Organization

- Matebele G. Sefali, General Manager—
- Mohale O.Mohale, Finance and Administration Manager
- Teboho Khetsekile, Procurement Manager
- Kotina Lieta, Assistant Procurement Manager
- Miki Ntšonyana, Assistant Procurement Manager
- Limakatso Maphotsa, Logistics Manager
- Phetha Matlanyane, Assistant Customer Care Manager
- Ntheosele Leopa, Quality Assurance Manager
- Pinkie Mokhethi, Acting Human Resources Manager

### Systems for Improved Access to Pharmaceuticals and Services—

- David Lee, MSH/CPM Director, Technical Strategy and Quality
- Wonder Goredema, SIAPS Senior Technical Advisor
- Charles Kagoma, MSH/CPM Technical Advisor
- Nomaphuthi Hoohlo, SIAPS/Lesotho Country Project Director
- Tlai-Tlai Sepetla, SIAPS/Lesotho Logistics Advisor
- Tsepang Ramanemane, SIAPS/Lesotho Technical Advisor

Systems for Improved Access to Pharmaceuticals and Services  
Management Sciences for Health  
1st Floor, NBC Sechaba House|Alliance Park|Four Bowker Road  
Maseru, Lesotho  
Telephone: +266.22.316.096  
Fax: +266.22.266.773



# EXECUTIVE SUMMARY

## Introduction

The National Drug Service Organization (NDSO) was established as a nonprofit organization in 1979 to procure, store, and distribute quality medicines and medical commodities for all the health institutions in Lesotho, including government hospitals and health centers, Christian Health Association of Lesotho (CHAL) facilities, and private clinics and pharmacies. It also stores and distributes a range of donated products, including antiretroviral (ARV) medicines, medicines for opportunistic infections, prevention of mother-to-child transmission (PMTCT) kits, food supplements, laboratory supplies, home-based care kits, contraceptives, and maternal and child health products.

The NDSO does not receive funding directly from the Government of Lesotho (GOL) and must recover all its costs through a handling (markup) fee system. Since 2008, building on an analysis conducted by the Strengthening Pharmaceutical Systems (SPS) Program, NDSO has modified its markup policy on two occasions, raising markup for commercial stock from 16% to 25%, then lowering it to 20% in financial year (FY) 2011/12. Markup for ARVs has been maintained at 7%, and there is no markup for donations.

At NDSO's request, the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program provided technical assistance to analyze recent NDSO operational costs and income trends and provide guidance on adjustments to existing markups to optimize the organization's operational liquidity to sustain quality services and products.

The study also aimed to—

- Assess data availability and accessibility to monitor effect of the markups
- Develop a simple, practical, and reproducible approach to inform markup or handling fee options
- Compare actual NDSO operational costs with those projected in the 2008 SPS analysis

The study team analyzed or calculated selected financial and operational performance indicators from data in NDSO department reports, in annual financial statements (for the past five years), or extracted from NDSO's information system, the RxSolution database.

## Findings

Management of donations and ARV supplies are a critical function of NDSO. The value of donations and ARVs comprise three to four times the value of commercial products supplied even though the number of donated and ARV items is only one-fifth the number of commercial items. NDSO directly delivers supplies to 64% of hospitals and health facilities, and its service level has improved over the past three years from 74.3% to 88.7%.

Financial and operational indicators show that NDSO is self-sustaining and has capacity to effectively conduct procurement and distribution operations. Stock turnover appears to be good for a not-for-profit wholesaler operation, although much of the turnover is owing to the handling of and accounting for donated products and ARV medicines. Overall, NDSO financial and operational performance compares favorably with that of some countries in the Americas and a couple of wholesaler operations in East Africa.

NDSO has undergone remarkable growth since 2006. Staffing increased 74% (a significant determinant of increased costs), the value of purchases increased 251%, sales grew 222%, and average inventory increased 101%. Except for FY 2007/08, NDSO recorded significant profits (surplus) over the past six financial years. However, a large share of the increase in annual profits was caused by currency fluctuations and therefore recorded under other income in the annual financial statements.

Nevertheless, cause for concern exists for a combination of reasons—

- The average inventory has been rising despite increased sales (handling of donations and commercial products).
- NDSO total costs have also been increasing and have exceeded income from sales in two of the past five financial years.
- Accounts receivable (money owed to NDSO) is significant and should be a cause for concern, if these debts cannot be recovered.
- Weak supply management at health centers, budget under-execution by Government health facilities purportedly due to health centers not receiving timely budget information, and health facility use of alternate supply sources could potentially reduce demand for NDSO products.

Projections of profit or loss under various scenarios of markup and increases in total NDSO expenditures suggest that profits are achieved only at a markup of 20% and at NDSO annual total cost increases of 10% and 15%. Markup of 16% may result in profit only if total NDSO annual cost increases are kept to 5%.

## **Conclusions and Recommendations**

- Given the magnitude of accounts receivable and the possible downward trend in sales and income with resulting projected income lower than NDSO expenditures, as reported in FY 2011/12, it would be too soon to make any changes in the 20% markup, which has been in effect only one year. It would be risky for NDSO to lower the markup until it can be shown that (a) sales are stable or are steadily increasing over several years and (b) costs are effectively controlled and kept at or under a 5% annual increase.
- NDSO expenditures must be closely monitored and controlled to identify appropriate measures to contain costs and increase efficiency. A more detailed analysis of the major cost elements, particularly staffing needs, may identify opportunities to lower costs.



- NDSO and the Ministry of Health (MOH) should work together to identify a mechanism or strategy to optimize health facility budget management, as well as optimize payment mechanisms to ensure that health facilities order and receive sufficient quantities of needed medicines and other health supplies. There is need to—
  - Develop and implement a mechanism, channels, and procedures for timely and effective communication of budget approval so that health facilities can make their supply orders on time and avoid shortages
  - Manage the ordering and payment system for essential medicines and supplies as is done for antiretroviral therapy (ART) supplies
  - Advocate for and explore centralizing the invoicing for requested supplies to the MOH and centralizing payment by the MOH, but maintain decentralized ordering (by health facilities), drawing down on the budget allocated to them for medicines and other health supplies
- NDSO has been operating with a net profit (surplus). With close expenditure (cost) monitoring and effective collection of accounts receivable, the funds that are currently available in the call accounts can be used for (a) enhancements in service, such as potential extension of distribution of supplies to additional delivery sites (health centers) and (b) capital, infrastructure, and equipment improvements, if appropriate. NDSO intends to purchase land on which to build a warehouse, but the purchase has been delayed. Although a perceived need exists for more warehouse space, it is advisable to formally assess whether (a) maintaining (and renovating) currently available warehousing space, accompanied by procurement system modifications, or (b) building additional warehouse space is better.
- Through the RxSolution system, data are available and accessible to monitor NDSO performance, and a core set of indicators—besides those that are reported in the annual financial statements—can be agreed upon and used for monitoring and reporting on NDSO performance. These may be reported in consolidated indicator-based regular reports (quarterly or yearly, as appropriate). NDSO could use methodological approach, practical guidance materials, and knowledge and capacity gained from the current analysis as and when needed in future to conduct similar cost analyses to inform appropriate markup or handling fee decisions.
- NDSO is currently financially successful and self-sustaining. However NDSO's contribution to desirable health outcomes through effective supply of essential health commodities appears to be suboptimal. Only just over a third (37%) of the number of medicines and less than a third (20 to 30%) by value of NDSO supplies correspond to items that are on the Lesotho Essential Medicines List. Although some of the underlying causes of health facility stock-outs and lack of medicine availability are associated with lack of supply management capacity at health facility level, a greater NDSO focus and alignment with supply management of essential medicines and supplies may contribute to more effective and efficient health care services.
- This NDSO cost analysis should be followed by a more comprehensive, system-wide analysis to identify options for improving effectiveness and efficiency of the national supply chain system for essential health commodities.

- Although responsibility for procurement and distribution of laboratory supplies was nominally transferred to NDSO, not all laboratory supplies are actually managed by NDSO. The MOH Central Laboratory continues to use the MOH procurement department to purchase supplies with donor funds. The Central Laboratory also stores a significant amount of its procured laboratory supplies with improper organization and in unclean conditions in a former Queen II Hospital central laboratory building. This storage facility has severe infrastructural defects, is staffed by one person with no warehousing management training, and likely houses unknown but significant quantities of expired, damaged laboratory products. This situation requires urgent attention and resolution.

## INTRODUCTION

The NDSO was established in 1979 as a nonprofit organization to procure, store, and distribute quality medicines and medical commodities for all the health institutions in Lesotho. The NDSO does not receive funding directly from the GOL and must recover all its costs. This is achieved through a handling (markup) fee system to generate income to cover the costs of its operations.

The NDSO provides commercial (trade) stock of pharmaceutical products and medical and laboratory supplies to government hospitals and health centers, CHAL facilities, and private clinics and pharmacies. It also stores and distributes a range of donated products,<sup>1</sup> including ARV medicines, medicines for opportunistic infections, PMTCT kits, food supplements, laboratory supplies, home-based care kits, contraceptives, and maternal and child health products.

In 2008, following a request from NDSO, the SPS Program, funded by the US Agency for International Development (USAID), conducted an analysis of NDSO operating costs and handling fees to assist in informing adjustments to the handling fees that were applied at that time. That request was triggered by NDSO's concern about continuously increasing operational costs and the need to recover those costs. The SPS study offered several product markup scenarios, based on estimates and projection of costs associated with handling of products donated by the various donors supporting Lesotho, and data on markups applied in public sector supply organizations in the African region.<sup>2</sup> Subsequently, NDSO modified its markup policy, setting a 0% markup for donated products, 7% markup for ARVs, and 25% for its commercial items during FY 2009/10 and 2010/11. Responding to complaints that the 25% markup was too high and observing that an income surplus has been accumulating, albeit operational cost increases, NDSO lowered the markup for commercial products to 20% during FY 2011/12; the markup for ARVs has been maintained at 7%.

NDSO is reassessing its markup policy and again has requested USAID technical assistance through the SIAPS Program.

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<sup>1</sup> Donors include the Clinton Foundation HIV/AIDS Initiative (CHAI), the United Nations Children's Fund (UNICEF), the United Nations Population Fund (UNFPA), the Stop TB Partnership Global Drug Facility (GDF), and the Pfizer Diflucan Program. NDSO handles the procurement, storage, and distribution of products for the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund).

<sup>2</sup> Strengthening Pharmaceutical Systems. 2008. *Cost Analysis of the National Drug Service Organization in Lesotho: Toward Establishing Optimum Handling Fees*. Arlington, VA: Strengthening Pharmaceutical Systems.

## OBJECTIVES

The primary objective of this technical assistance is to analyze recent NDSO operational costs and income trends and provide guidance on adjustments to existing markups to optimize the organization's operational liquidity to sustain quality services and products.

The secondary objectives are to—

- Assess data availability and accessibility to monitor effect of the markups
- Develop a simple, practical, and reproducible approach to inform markup or handling fee options
- Compare actual NDSO operational costs with those projected in the 2008 SPS analysis

## METHODOLOGY

The team obtained or calculated selected financial and operational performance indicators from data in NDSO department reports, in annual financial statements, or extracted from NDSO's information system, the RxSolution database.

NDSO managers and staff provided reports, including procurement (tender) analyses, quality assurance reports, distribution schedules, and service level calculations.

The NDSO annual financial statements are prepared and reported in standardized format and are available and accessible for the past five years (years ended March 31, 2008–2012). These reports are supported by Excel spreadsheets containing detailed, related financial data.

The NDSO RxSolution database contains stock management data elements that include the stock identifier code, description, pack size, unit acquisition cost, markup, sales price, and quantities of receipts and issues since 2009.

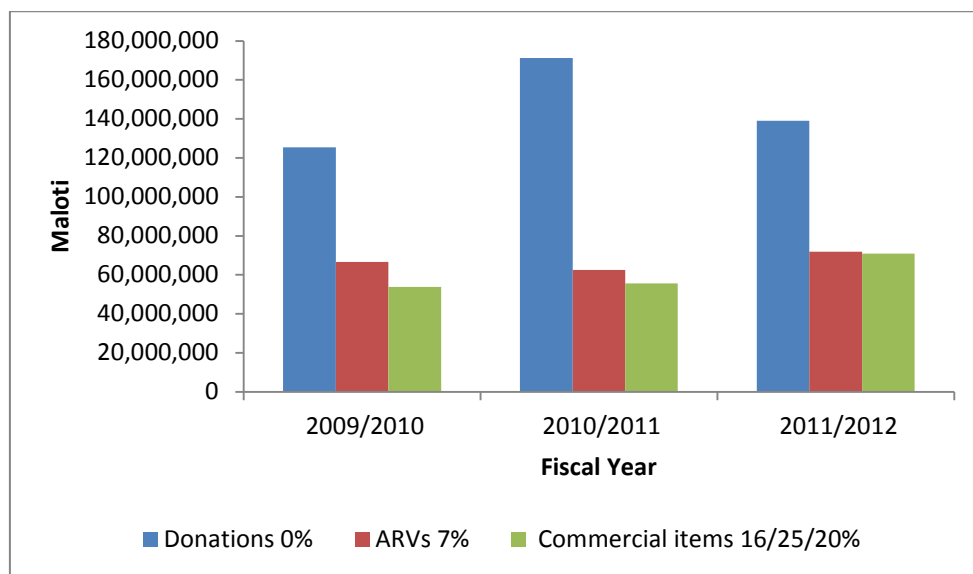
Standard financial management and cost indicators that were reported in the annual financial statements and key indicators selected to assess NDSO operational performance included the inventory (or stock) turnover, inventory shrinkage, inventory holding cost, inventory holding cost as a percentage of average inventory, delivery lead time, and service level. The glossary section of this report compiles definitions for the key indicators.

RxSolution data were exported to Microsoft Excel 2010 spreadsheets for calculation and analysis. Spreadsheets containing data on items and its description or specification, quantities received or issued, markup, acquisition cost, and selling cost were set up according to the financial year period (April to the following March), to be consistent with period covered in the annual financial statement. However, this does not ensure that the calculations necessarily correspond exactly with each other, because they are two different data sets processed at different times. For analyses that depended on RxSolution data, it was only possible to look at the past three financial years, particularly for projecting potential income from various markup and cost scenarios.

## FINDINGS

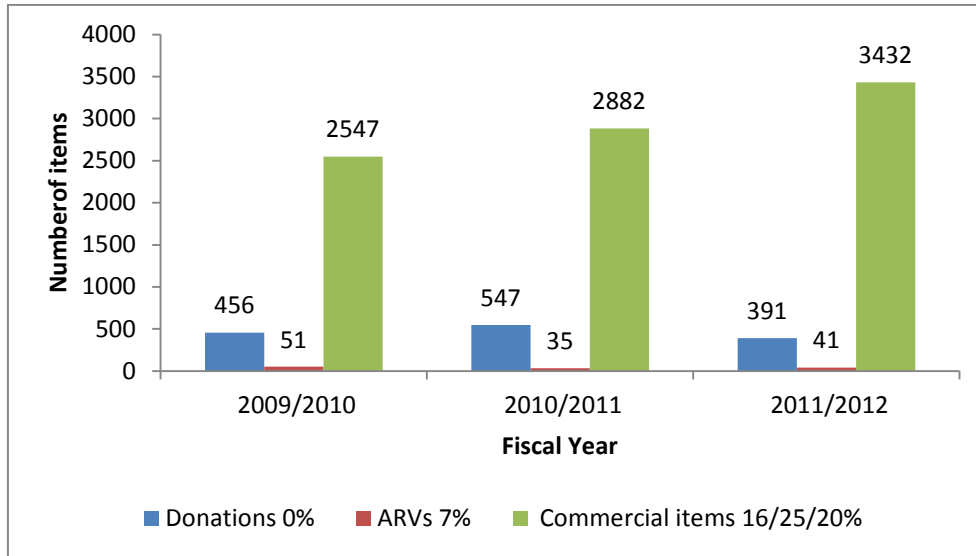
### NDSO Growth

In FY 2011/12, NDSO supplied 3,864 items, 89% of which were commercial stock and 11% donated products and ARVs. The number of supplied products has increased from 3,058 items, of which 83% were commercial stock, in 2009/10. Although the donated items are only 11 to 17% of all items issued, their value is between about one-half and three-fourths (42% and 75%) of total value of products supplied (with or without a 7% markup for ARVs). Figures 1, 2, and 3 clearly illustrate how the value of donations and ARVs constitute three to four times the value of commercial products supplied even though the number of donated and ARV items is one-fifth the number of commercial items.



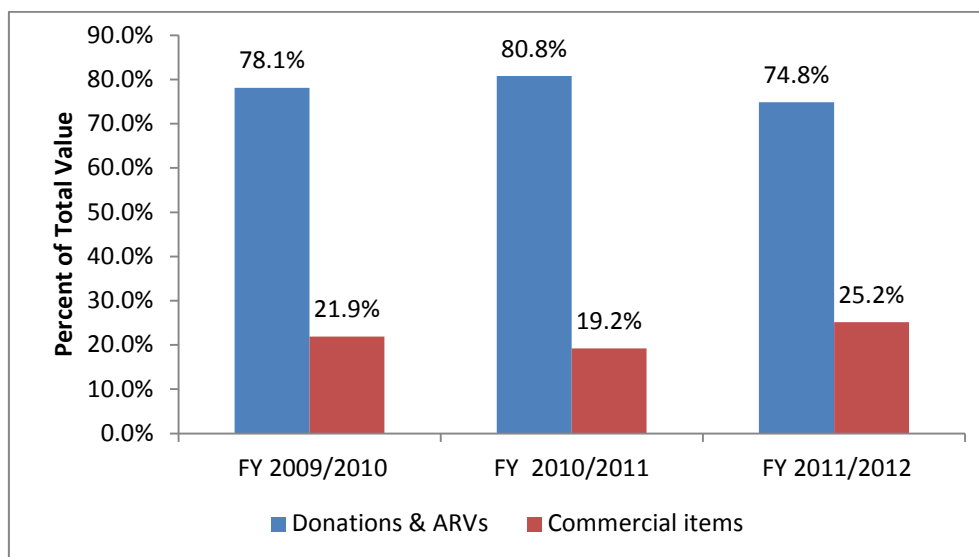
Source: RxSolution.

**Figure 1. Value of items supplied by NDSO at markups of 0% (donations), 7% (ARVs), and 16%/25%/20% (commercial items), FY 2009/10–FY2011/12**



Source: RxSolution.

**Figure 2. Number of items supplied by NDSO at markups of 0% (donations), 7% (ARVs), and 16%/25%/20% (commercial items), FY 2009/10–FY 2011/12**



Source: RxSolution.

**Figure 3. Relative share of value of donated and ARV items compared with commercial items supplied by NDSO, FY 2009/10–FY 2011/12**

Of 3,864 health products supplied in FY 2011/12, 62% were non-medicines and 38% medicines, but only about two-fifths (37%) of the supplied medicines were listed in the Essential Medicines List of Lesotho. However, non-medicines accounted for only 19% of the value of products received and 22% of the value of products issued. Medicines accounted for about four-fifths of the value of items (82% of the value of items received and 78% of the value of items issued).

NDSO has undergone remarkable growth since 2006. Staffing increased 74%, the value of purchases increased 251%, sales grew 222%, and the average inventory 101% (table 1).

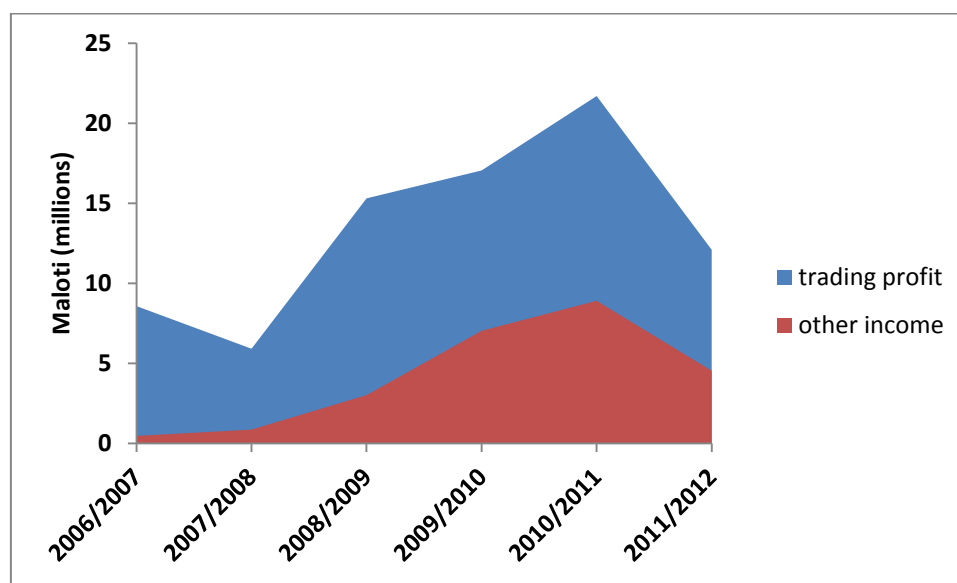
Except for one year (FY 2007/08), NDSO recorded significant profits (surplus)<sup>3</sup> over the past six years. A large share of the increase in annual profits was caused by currency fluctuations (figure 4), recorded under other income in the financial statements.<sup>4</sup>

**Table 1. NDSO Growth, 2006/07–2011/12**

Sector	Financial year					
	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012
Human resources	46	45	60	62	63	80*
Purchases (LSL)	41,237,347	58,638,113	90,638,809	112,648,458	155,083,020	144,682,756
Sales (LSL)	49,461,905	59,666,386	103,209,765	127,408,243	173,659,726	159,343,119
Average inventory (LSL)	12,751,837	15,579,969	19,475,969	22,106,265	24,951,483	25,629,148
Net profit or surplus	817,935	-543,805	5,246,590	13,383,086	17,575,894	1,454,198

Note: LSL = Lesotho loti.

\* Six staff were supported by the Global Fund.



Source: NDSO annual financial statements.

**Figure 4. Income from product sales (trade profit) and other income**

NDSO recorded gross profits (surplus) over the past five years (figure 3) and net profit (surplus) in five of the past six years. However, when one considers that the income or gross profit from markups and sales of the commercial items should cover all NDSO expenses, two of the past five years recorded deficits (FY 2007/08 and FY 2011/12) (figure 4). The deficits were 1,413,074 Lesotho loti (LSL) in FY 2007/08 and LSL 3,090,948 in FY 2011/12. These

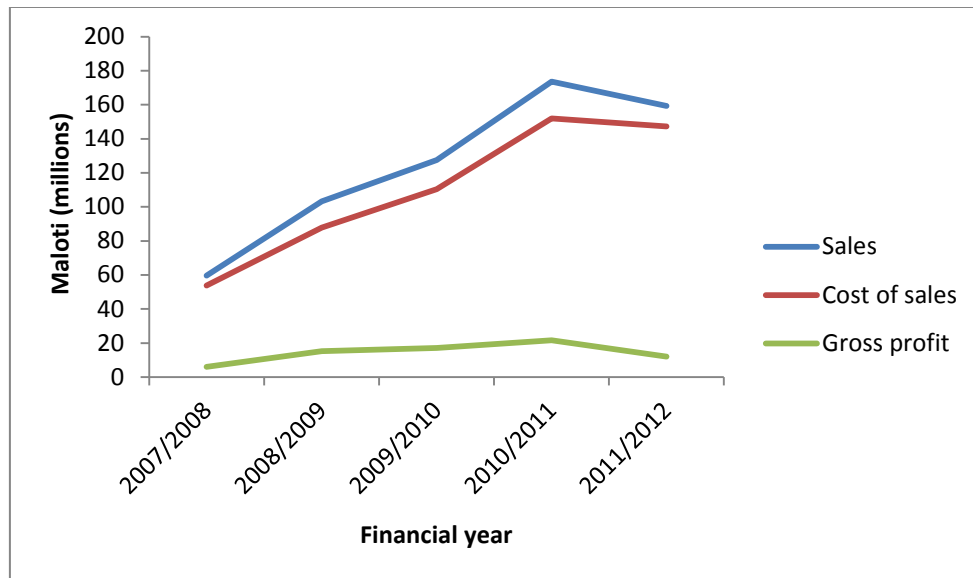
<sup>3</sup> NDSO reports excess revenues over expenditures as profits, even though it is a not-for-profit organization.

<sup>4</sup> “Other income” includes items such as income from sale of tender documents, interest from call accounts, interest from long-term loans, income from rental, sundry, transport, profit on disposal, foreign exchange fluctuations, and leave pay (reduction of provision).



deficits were “hidden” or offset by “other income” as reported in the financial statements, resulting in net profit (surplus).<sup>5</sup>

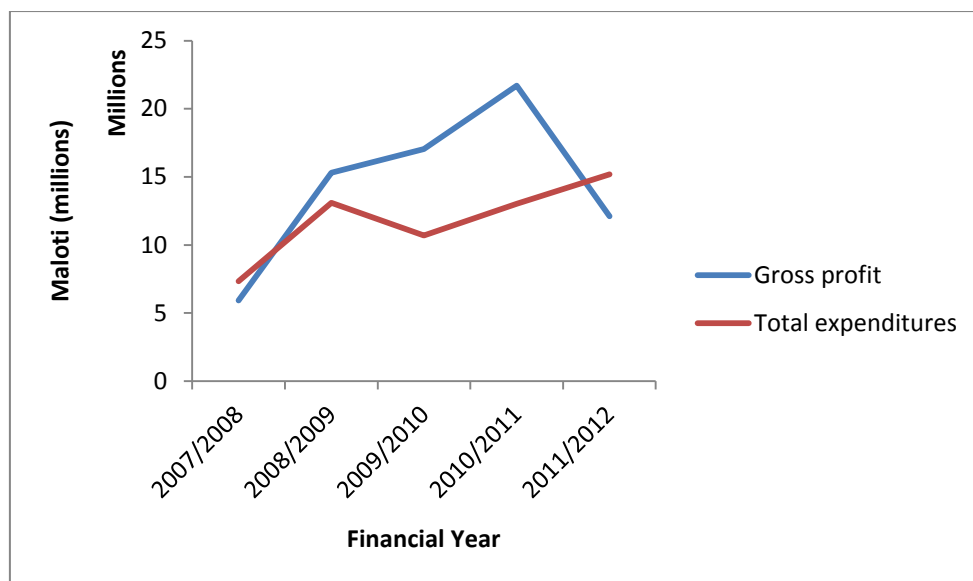
However, one must bear in mind that product sales are ideally the sole source of revenue and income that must cover the organization’s total expenditures. NDSO relies primarily on product sales for revenue; it does not receive any funding from the GOL, nor from any donor, except about LSL 1.4 million that it reportedly received from the Dutch government decades ago. The contribution of “other income items” too is anomalous and should not be counted on as a dependable source of income to cover NDSO costs.



Source: NDSO annual financial statements.

**Figure 5. NDSO sales, cost of sales, and gross profit**

<sup>5</sup> “Other income” included items such as interest income, tender document sales, income from rental, transport, “sundry” income, profit on disposal of assets, and foreign exchange gains or losses. The dramatic increases in “other income” were due primarily to gains from foreign exchange fluctuations (up to 97% in one year). Financing (or interest income) accounted for less than 3% of “other income.” The sale of tender documents was less than 1% of “other income.”



Source: NDSO annual financial statements.

**Figure 6. NDSO gross profit and total expenditures**

The annual financial statements report a huge increase of 830.5% in the two NDSO bank accounts (call accounts), which now have a balance of LSL 47,530,698 (FY 2011/12). Accounts payable is money that is owed to NDSO suppliers, or other debts. In the organization's balance sheet it is presented as a liability. When all payables are included (trade creditors, pension fund, salaries, various taxes, and debtors with credit balances), the accounts payable (LSL 50,998,929) exceeds the accounts receivable (LSL 38,276,055). The call accounts balance would not be enough to cover all the accounts payable, if nothing from the accounts receivable is collected.

NDSO's accounts payable to trade creditors is only LSL 14,515,725, equivalent to about one-third (30.5%) of the call accounts balance. However, the amounts receivable from debtors' trade (supplied clients) is quite a significant amount of money (LSL 38,908,013), equivalent to just over four-fifths (81.9%) of the 2012 call account balance. This is a cause for concern for the following reasons—

- Government health facilities do not fully execute their available budget because they do not receive timely information about their budget situation and do not submit corresponding health supplies purchase orders to NDSO.
- NDSO is unlikely to recover the accounts receivable any time soon, thanks to a perceived conflict of interest arising from the GOL's direct ownership of NDSO as well as ownership of public health facilities either directly or indirectly by subsidizing CHAL with funding for medicines and related health commodities.

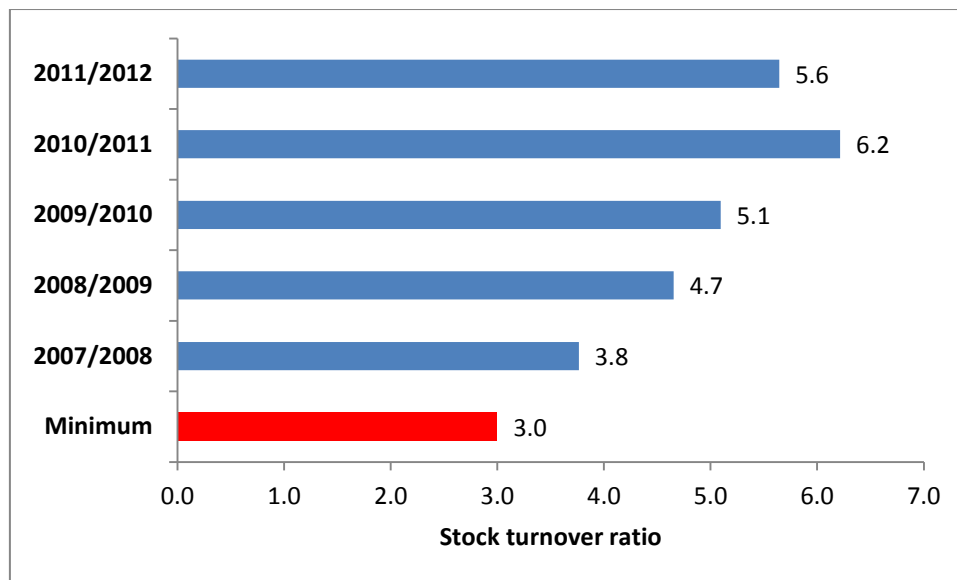
Basically, the GOL (through NDSO) cannot stop supplying to debtors/public health facilities (i.e., itself) when payments are delinquent. Similarly, the GOL cannot pay VAT for revenue generated by credit to itself, whenever public health facilities procure by credit.

NDSO has decided to procure new land to build a new, larger warehouse; the expansion project is estimated to require USD 25 million. It is not yet confirmed where construction funds will come from, but they are most likely expected to be covered through net income

from sales. The call accounts current balance is only about 21% of the amount needed. Thus, although NDSO appears to be currently in good financial shape, the amounts owed to the organization, if not recovered, coupled with potentially decreasing sales (because of health facility supply management weaknesses) and the significant expenditures related to the warehouse expansion project, may significantly erode the organization’s financial situation.

### NDSO Stock Turnover

The following figures show that NDSO has doubled its stock turnover ratio over the past five years (figure 7); this is a considerable improvement from a 3.8 turnover ratio that was just above the minimum (3.0) considered acceptable in commercial operations.<sup>6</sup> The dramatic improvement in turnover ratio is mainly because of the financial accounting and handling of donations and ARV supplies, rather than from increased turnover of the commercial stock.



Source: NDSO annual financial statements.

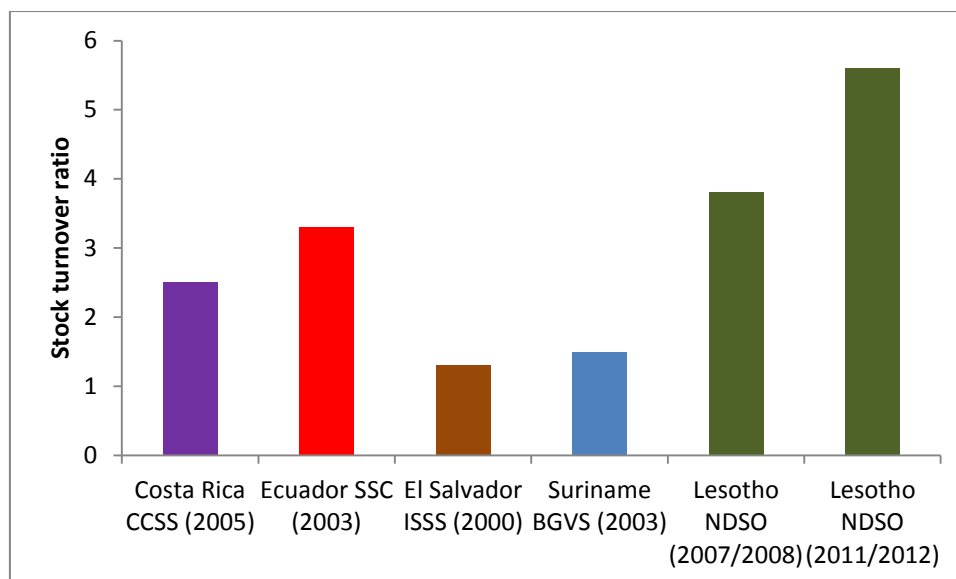
**Figure 7. NDSO stock turnover, 2007/08–2011/12**

NDSO stock turnover also was much better than similar public sector operations in selected countries in the Americas<sup>7</sup> (figure 8). NDSO’s stock turnover is better than that observed in a couple of public and private nonprofit wholesaler operations in East Africa<sup>8</sup> (figure 9). Although the data relate to different years, these comparisons provide an indication of how other similar wholesaler operations have performed.

<sup>6</sup> *Stock turnover* is the total value of commodities purchased or distributed, divided by the average inventory value. A stock turnover ratio of 3 is considered the minimum acceptable, but most private for-profit companies expect a turnover ratio of 12 or higher. Because of the purchasing model followed by public and nonprofit operations, a ratio of at least 6 is considered realistic for public systems (Management Sciences for Health. 2011. *MDS-3: Managing Access to Medicines and Health Technologies*. Sterling, VA: Kumarian Press).

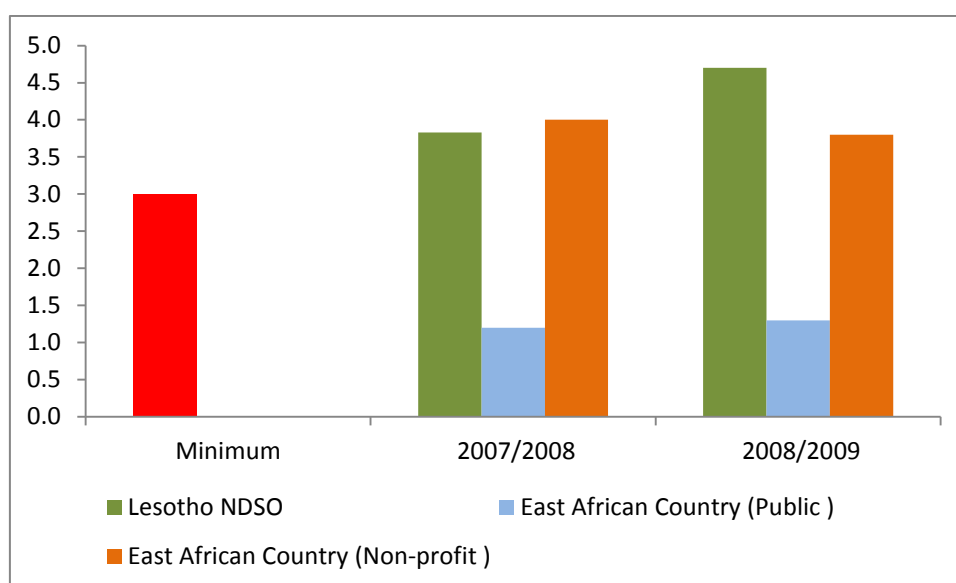
<sup>7</sup> Costa Rican Social Security Fund (CCSS), Costa Rica; Rural Workers Social Security (SSC), Ecuador; Salvadoran Social Security Institute, El Salvador; Drug Supply Company (BGVS), Suriname.

<sup>8</sup> Unpublished MSH observations.



Sources: NDSO annual financial statements; MSH pharmaceutical supply system assessment data.

**Figure 8. NDSO stock turnover compared with public wholesaler operations in selected countries in the Americas**



Sources: NDSO annual financial statements; MSH unpublished data.

**Figure 9. NDSO stock turnover comparison with East African public and nonprofit wholesalers**

## Expense Ratio

The expense ratio (total operating expenses divided by net sales or value of medicines distributed) may provide an indication of how efficiently services are being provided. The lower the ratio, the better NDSO would be performing. The expense ratio has decreased from 0.14 in FY 2007/08 to 0.10 in FY 2011/12.

## Inventory Shrinkage

Inventory shrinkage caused by theft, product expiry, or damage is a significant concern for public sector wholesaler operations. This may not be the case for NDSO, which reports only an annual provision of LSL 503,170 for obsolete stock. Calculation of the inventory shrinkage ratio<sup>9</sup> does not reveal a shrinkage problem. Surprisingly, the inventory has actually been increasing over the five-year period, even with increased demand and supply of health products. Accumulation of inventory should be a concern to NDSO, particularly if it is caused by decreased demand from clients who may actually need the products but are not purchasing them.<sup>10</sup> This issue affects appropriate NDSO forecasting for its procurement requirements and potentially leads to unnecessary wastage.

## NDSO Distribution

Scheduled delivery data indicate that NDSO regularly delivers directly to 64% of 215 health care facilities, arranged in four groupings: Central, Highlands, North, and South. In addition to deliveries to main hospitals and the 10 District Health Management Team locations for subsequent redistribution to district health facilities, NDSO delivers directly to health centers that are close to or along the route to the District Health Management Teams. Further analysis of fuel and other distribution-related costs will contribute to inform whether expansion of NDSO distribution to additional health centers or continuation with current practice would be cost-effective.

## NDSO Service Level

Table 2 provides data on the number of clients (“demanders”), the number of items ordered, and the average and median values for service level (percentage of ordered quantities that were filled and supplied to clients).<sup>11</sup> NDSO calculations indicate that, for products ordered over the past three financial years, the service level progressively improved, from 74.3% to 88.7%.

**Table 2. NDSO Service Level, 2009/10–2011/12**

<b>Financial year</b>	<b>2009/2010</b>	<b>2010/2011</b>	<b>2011/2012</b>
Number of clients	170	179	192
Number of items ordered	20,991	22,360	23,304
Service level: average	74.3%	82.5%	88.7%
Service level : median	76.0%	84.0%	89.3%

*Sources:* RxSolution® database; NDSO calculations.

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<sup>9</sup> The inventory shrinkage is calculated as opening inventory value plus purchases minus the sum of the cost of products sold and the ending inventory value.

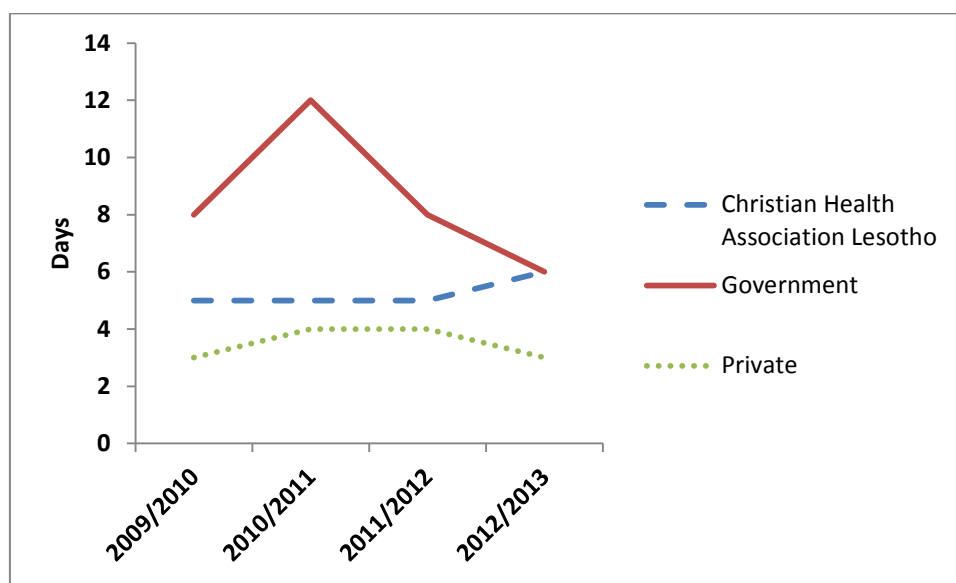
<sup>10</sup> It is affirmed that poor or inadequate communication of approved budget information contributes to weak health facility resupply management.

<sup>11</sup> The number of unique clients (those who ordered or purchased NDSO stock and the number of ordered items (not quantities of each item) was obtained from the RxSolution database. These data may or may not correlate fully with the percentage reported annually for the service level. The service level values were calculated from separate records kept by NDSO, because the RxSolution capability for doing this had been modified and was not used.

The NDSO service level recorded for the past three financial years contrasts sharply with Ministry of Health and Social Welfare (MOHSW) data from November 2009. MOHSW data indicated low availability of medicines at health centers (57.7% availability with average stock-out period of 143.7 days for all medicines and 107 days for ARVs) and much better availability at hospitals (77.7% availability of medicines with stock-out period of 17 days, but only 7 days stock-out period for ARVs).<sup>12</sup> Poor health facility (hospital and health center) inventory management, lack of knowledge about their budgets, and nonadherence to procurement procedures were key contributors to the insufficient availability and length of stock-out periods. Moreover, over one-third (36%) of health centers procured supplies from other suppliers. No data are available to determine how much the situation has changed since then, but it is unlikely to have improved significantly. A need therefore exists to conduct a more comprehensive analysis and identify options for closing existing gaps and improving effectiveness and efficiency of the national health commodity supply chain management system. The NDSO cost analysis is part of the broader supply chain options analysis.

### NDSO Lead Time

The time between NDSO receipt of client orders and delivery of items (lead time) varies according to type of client (government hospitals and health facilities, CHAL clinics, and private sector). As illustrated in figure 10, the average lead time to service GOL facilities improved from a high of 12 days in FY 2010/11 to 6 days in FY 2011/12. Lead time for CHAL facilities and private pharmacies was more consistent over the same period.



Source: NDSO reports.

**Figure 10. NDSO lead time to fulfill client orders, FY 2009/10–FY 2013 (first six months)**

<sup>12</sup> MOHSW. 2010. *Medicines Access Survey: Lesotho*. Maseru, Lesotho: MOHSW.

## **NDSO Total Costs and Inventory Holding Costs**

The 2008 SPS study projected an increase of 50% in overall NDSO costs over a three-year period.<sup>13</sup> The annual financial statements reported an increase of 78% over this same period. There were wide percentage change fluctuations from year to year, increasing 78%, decreasing 18%, and then increasing again 22%. Actual costs were 28 percentage points higher than SPS projections, although possibly not all potential costs had been included in the SPS projections.

Total NDSO expenditures have doubled from LSL 7,331,362 in FY 2007/08 to LSL 15,188,520 in FY 2011/12. Table 3 compiles the expenditures reported in the corresponding financial statements, the change from the preceding year, and the change at the end of the five-year period. The major costs were personnel related (salaries, staff welfare and incentives, pension fund company contributions, wages). Depreciation expenses were the second highest single-cost item, after salaries. Fuel, motor vehicle expenses, and repairs and maintenance were also major cost items. Table 4 compiles the annual NDSO costs that are related to holding inventory.<sup>14</sup>

NDSO expenditures varied annually for many line items, some increasing and others decreasing. Overall, the annual change in expenditures was on average 179.8%, with a median value of 24.9%. Twenty-six of 36 cost items listed in the financial statements increased spending from FY 2007/08 to FY 2011/12. Salary costs increased 63.9%, pension fund contributions 65.3%, and staff welfare and incentives 159.5%.<sup>15</sup> Fuel expenses increased 23.1%, motor vehicle expenses 126.4%, and repairs and maintenance 281.7%.

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<sup>13</sup> Annual cost increases were based on assumptions of a 10% increase in fixed costs (allowing for inflation) and minimal increase in staffing levels; variable costs were assumed to increase in proportion to estimated increase in volume of products and their corresponding values.

<sup>14</sup> These are costs related to warehousing, distribution, and customer service.

<sup>15</sup> Staff increased from 45 to 80 persons over this period. The lower SPS projections on NDSO costs had been based on 10% annual fixed cost increase with minimal increase in number of staff.

Table 3: Percentage Change in NDSO Expenditure, FY 2007/08–FY 2011/12

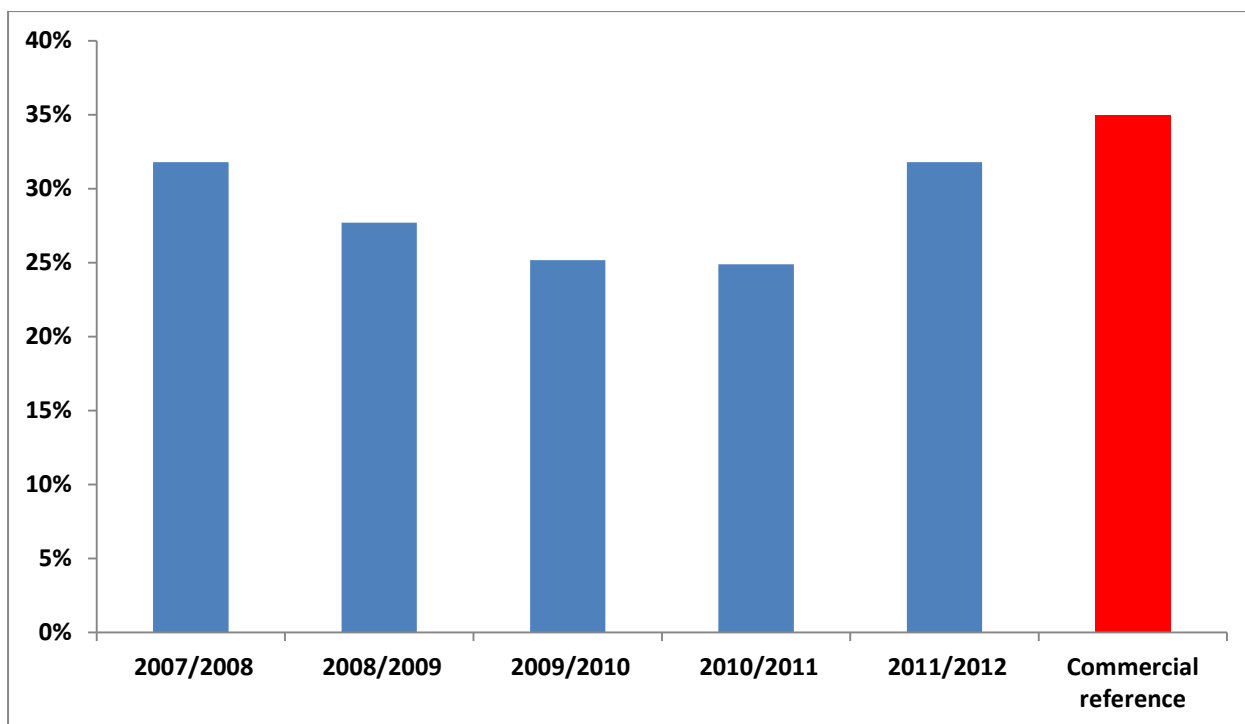
Description	2007/2008		2008/2009		2009/2010		2010/2011		2011/2012		2011-2012/ 2008-2009
	Expenditure	Expenditure	Change	Expenditure	Change	Expenditure	Change	Expenditure	Change	Change	
Director expenses	4,373	7,995	82.8%	3,510	-56.1%	8,357	138.1%	55,005	558.2%	588.0%	
Subscriptions & reference materials	4,836	2,847	-41.1%		-100.0%	77,571		16,067	-79.3%	464.3%	
Repairs & maintenance	60,658	120,759	99.1%	263,584	118.3%	195,197	-25.9%	460,940	136.1%	281.7%	
Training expenses	121,670	69,606	-42.8%	127,143	82.7%	172,316	35.5%	236,810	37.4%	240.2%	
Protective clothing	39,284	31,204	-20.6%	44,113	41.4%	51,582	16.9%	104,164	101.9%	233.8%	
Office supplies	40,739	38,194	-6.2%	77,969	104.1%	136,016	74.4%	105,499	-22.4%	176.2%	
Travelling expenses	74,002	84,538	14.2%	167,685	98.4%	207,414	23.7%	221,521	6.8%	162.0%	
Staff welfare & incentives	228,278	243,159	6.5%	327,043	34.5%	428,375	31.0%	630,981	47.3%	159.5%	
Incineration expenses	7,114	4,615	-35.1%		-100.0%	2,365		11,920	404.0%	158.3%	
Donations	7,196	25,800	258.5%	18,850	-26.9%	10,444	-44.6%	58,619	461.3%	127.2%	
Motor vehicle expenses	117,315	163,053	39.0%	320,248	96.4%	219,665	-31.4%	369,228	68.1%	126.4%	
Consultancy & legal fees	227,978	48,564	-78.7%	15,490	-68.1%	43,660	181.9%	102,465	134.7%	111.0%	
Severance pay	90,752	303,108	234.0%	292,079	-3.6%	386,968	32.5%	528,278	36.5%	74.3%	
Depreciation expenses	490,109	873,465	78.2%	831,473	-4.8%	1,320,731	58.8%	1,505,760	14.0%	72.4%	
Pension Fund Company contributions	263,609	356,960	35.4%	429,440	20.3%	448,534	4.4%	590,097	31.6%	65.3%	
Insurance expenses	214,658	286,647	33.5%	291,596	1.7%	361,038	23.8%	471,555	30.6%	64.5%	
Salaries	3,228,463	4,322,155	33.9%	5,133,698	18.8%	5,403,048	5.2%	7,082,219	31.1%	63.9%	
Packaging materials	309,042	226,064	-26.9%	67,050	-70.3%	110,325	64.5%	330,255	199.3%	46.1%	
Hospitality	7,193	4,887	-32.1%	10,868	122.4%	17,183	58.1%	6,827	-60.3%	39.7%	
Electricity	78,927	120,614	52.8%	109,035	-9.6%	117,042	7.3%	163,606	39.8%	35.6%	
Wages	50,477	49,375	-2.2%	55,812	13.0%	87,958	57.6%	65,799	-25.2%	33.3%	
Security services	129,102	126,347	-2.1%	58,483	-53.7%	78,067	33.5%	166,873	113.8%	32.1%	
Bank charges	168,890	221,867	31.4%	188,579	-15.0%	266,300	41.2%	273,321	2.6%	23.2%	
Fuel expenses	367,721	472,405	28.5%	386,890	-18.1%	406,828	5.2%	581,434	42.9%	23.1%	
Printing and stationery	127,342	187,568	47.3%	208,337	11.1%	137,739	-33.9%	221,145	60.6%	17.9%	
Advertising	67,159	147,541	119.7%	106,531	-27.8%	285,964	168.4%	169,446	-40.7%	14.8%	
Postage, phone & fax	345,466	342,548	-0.8%	445,816	30.1%	454,246	1.9%	340,973	-24.9%	-0.5%	
Computer expenses	103,902	103,557	-0.3%	136,235	31.6%	183,437	34.6%	102,468	-44.1%	-1.1%	
Cleaning	31,919	60,007	88.0%	41,783	-30.4%	55,060	31.8%	58,969	7.1%	-1.7%	
Personnel costs	50,422	90,952	80.4%	55,433	-39.1%	59,463	7.3%	49,155	-17.3%	-46.0%	
Sundry expenses	2,511	289,019	11410.1%	9,485	-96.7%	1,789	-81.1%	41,255	2206.0%	-85.7%	
Audit fees	34,200	41,040	20.0%		-100.0%	36,000			-100.0%	-100.0%	
Bad debts	125,001	300,000	140.0%	450,000	50.0%	1,200,000	166.7%		-100.0%	-100.0%	
Carriage outwards		2,000			-100.0%					-100.0%	
Foreign exchange fluctuations	56,771	3,313,264	5736.2%		-100.0%					-100.0%	
Product re-analysis		2,550			-100.0%	40,432			-100.0%	-100.0%	
Leave pay	47,983		-100.0%								
Rental expenses	6,300		-100.0%								
Water				28,523		21,220	-25.6%	65,866	210.4%		
<b>TOTAL</b>	<b>7,331,362</b>	<b>13,084,274</b>		<b>10,702,781</b>		<b>13,032,334</b>		<b>15,188,520</b>			



Table 4. NDSO Inventory Holding Costs, FY 2007/08–FY 2011/12

Cost category	Fiscal year holding costs (LSL)				
	2007/08	2008/09	2009/10	2010/11	2011/12
Advertising	40,295	88,525	63,919	171,578	101,668
Cleaning	17,555	33,004	22,981	30,283	32,433
Computer expenses	780	20,711	27,247	36,687	20,494
Electricity	19,732	30,154	27,259	29,261	40,902
Fuel expenses	330,949	425,165	348,201	366,145	523,291
Incineration expenses	7,114	4,615		2,365	11,920
Insurance expenses	118,062	157,656	160,378	198,571	259,355
Motor vehicle expenses	105,584	146,748	288,223	197,699	332,305
Office supplies	22,406	21,007	42,883	74,809	58,024
Packaging materials	309,042	226,064	67,050	110,325	330,255
Pension Fund Company contributions	122,051	165,272	198,831	207,671	273,215
Personnel costs	23,345	42,111	25,665	27,531	22,759
Postage, phone & fax	120,913	119,892	156,036	158,986	119,341
Printing and stationery	57,304	84,406	93,752	61,983	99,515
Product reanalysis		2,550		40,432	
Protective clothing	39,284	31,204	44,113	51,582	104,164
Repairs and maintenance	33,362	66,417	144,971	107,358	253,517
Salaries	1,494,778	2,001,158	2,376,902	2,501,611	3,279,067
Security services	71,006	69,491	32,166	42,937	91,780
Staff welfare and incentives	105,693	112,583	151,421	198,338	292,144
Wages	23,371	22,861	25,841	40,725	30,465
Water			7,131	5,305	16,467
<b>Total</b>	<b>3,062,627</b>	<b>3,871,591</b>	<b>4,304,968</b>	<b>4,662,182</b>	<b>6,293,080</b>
Average inventory value	15,579,969	19,475,969	22,106,265	24,951,483	25,629,148
Holding costs as percentage of average inventory	19.7	19.9	19.5	18.7	24.6
Other hidden or nonvisible costs					
Financial opportunity costs	886,500	383,677	132,638	149,709	153,775
Costs of expiry, write-offs	503,170	503,170	503,170	503,170	503,170
Depreciation (total)	436,755	555,311	504,208	943,598	1,023,700
Adjusted total costs	4,889,052	5,313,748	5,444,984	6,258,659	7,973,725
Average inventory value	15,579,969	19,475,969	22,106,265	24,951,483	25,629,148
Holding costs as percentage of average inventory	31.4	27.3	24.6	25.1	31.1

Source: Calculated from data provided in the NDSO annual financial statements and NDSO cost allocation assumptions.

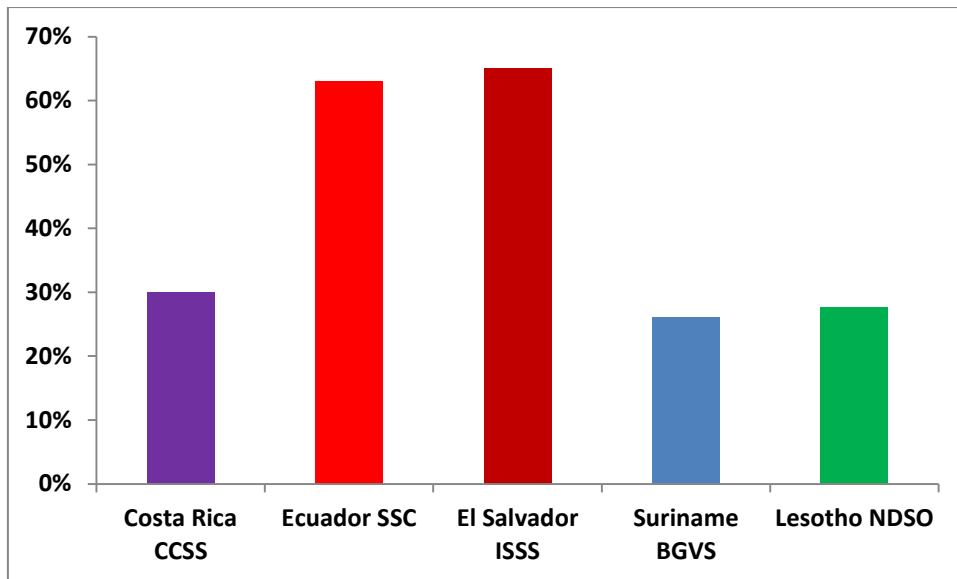


Sources: NDSO financial statements; finance manager cost distribution estimates.

**Figure 11. Holding costs as percentage of average inventory, FY 2007/08–FY 2011/12**

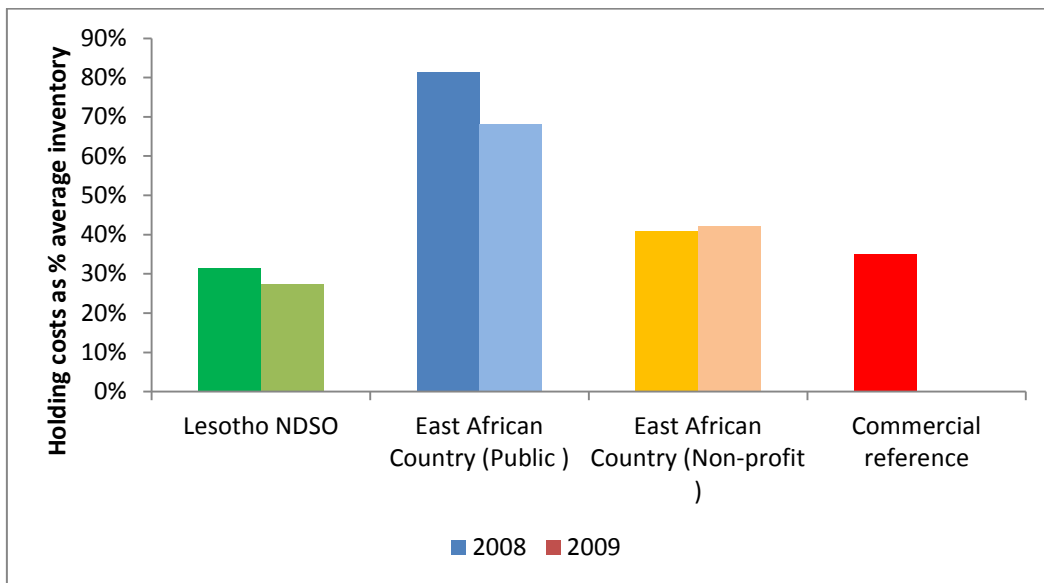
Holding costs as a percentage of average inventory provides an indication of operating efficiency. It can be used to monitor efficiency over time or to compare operating efficiency between wholesaler operations. As seen in table 4 data and figure 11, NDSO holding costs as a percentage of average inventory have been acceptable, at less than the benchmark of 35% for private sector firms, which is consistent with previous SPS study findings. NDSO holding costs as a percentage of average inventory compares favorably with those observed in several central medical store operations analyzed by MSH in Latin American countries<sup>16</sup> (figure 12). Unpublished MSH data suggest that NDSO also compares well with some organizations in East Africa (figure 13).

<sup>16</sup> Costa Rican Social Security Fund (CCSS), Costa Rica; Rural Workers Social Security (SSC), Ecuador; Salvadoran Social Security Institute, El Salvador; Drug Supply Company (BGVS), Suriname.



Sources: NDSO financial statements; finance manager cost distribution estimates; MSH supply system assessment studies.

**Figure 12. NDSO holding costs as a percentage of average inventory, compared with those observed in central medical stores in the Americas in the early to mid-2000s**



Source: NDSO annual financial statements; MSH data.

**Figure 13. Comparison of NDSO holding costs with public and private nonprofit wholesaler operations in an East African country, 2008 and 2009**

### Projecting Income from Commercial Sales and Expenditures

Given expressed opinions that the 20% markup is excessive, considering a further increase for commercial items may not be advisable. If the markup is lowered, it is unlikely to be less than the 16% that was applied in 2008 before it was raised to 25% and subsequently lowered to the current 20% in 2011.

Potential consumption is difficult to predict; the last financial period showed a decrease in sales, after significant increase the previous four financial years. For this exercise, potential

income derived from sales is projected on the basis of items and quantities as sold in the three financial years captured in the RxSolution system, assuming an annual increase of 10% in demand. Prices for the items were set at the acquisition cost recorded in RxSolution.

The NDSO annual financial statements for the period 2007 to 2012 reported an average increase of 25% in expenditures, with a median of 19%. If one considers only the past three years, the average increase in expenditures was 7%, with a median of 17%. Assuming that (a) expenditures will continue to increase, despite some cost control measures, but (b) increase in demand for supplies and services will also increase, three levels of expenditure increases can give a conservative range of NDSO expenditure estimates to assess the sufficiency of the two markup scenarios.

The assumptions for the two scenarios are as follows—

- Scenario 1: Markups at 7% and 20% (current situation)

No change is expected for products with the established markup of 7% (since 2008). The projection of income to be derived from sales at a 20% markup assumes three situations:

1. Items and quantities as sold in FY 2009/10
2. Items and quantities as sold in FY 2010/11
3. Items and quantities as sold in FY 2011/12

After the first year, each subsequent year will project an increase of 10% in demand for each situation.

For the corresponding years, NDSO expenditures are projected at annual increases of 5%, 10%, and 15%.

- Scenario 2: Markups at 7% and 16% (lowering commercial item markup to 2008 level)

No change is expected for products with the established markup of 7% (since 2008). The projection of income to be derived from sales at a 16% markup assumes three situations:

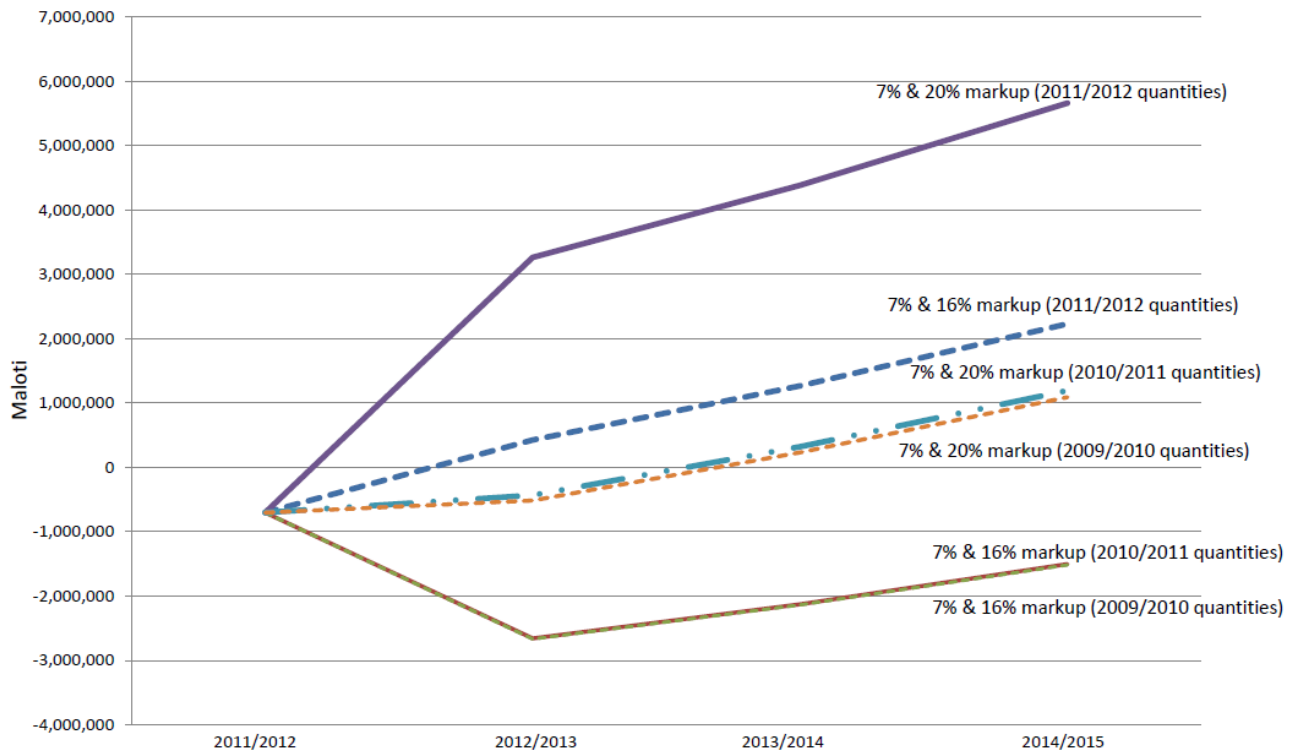
1. Items and quantities as sold in FY 2009/10
2. Items and quantities as sold in FY 2010/11
3. Items and quantities as sold in FY 2011/12

After the first year, each subsequent year will project an increase of 10% in demand for each situation.

For the corresponding years, NDSO expenditures are projected at annual increases of 5%, 10%, and 15%.

Figures 14, 15, and 16 illustrate the profit and/or loss derived from the various markups and quantities for scenarios of 5%, 10%, and 15% increase in NDSO total expenditures.

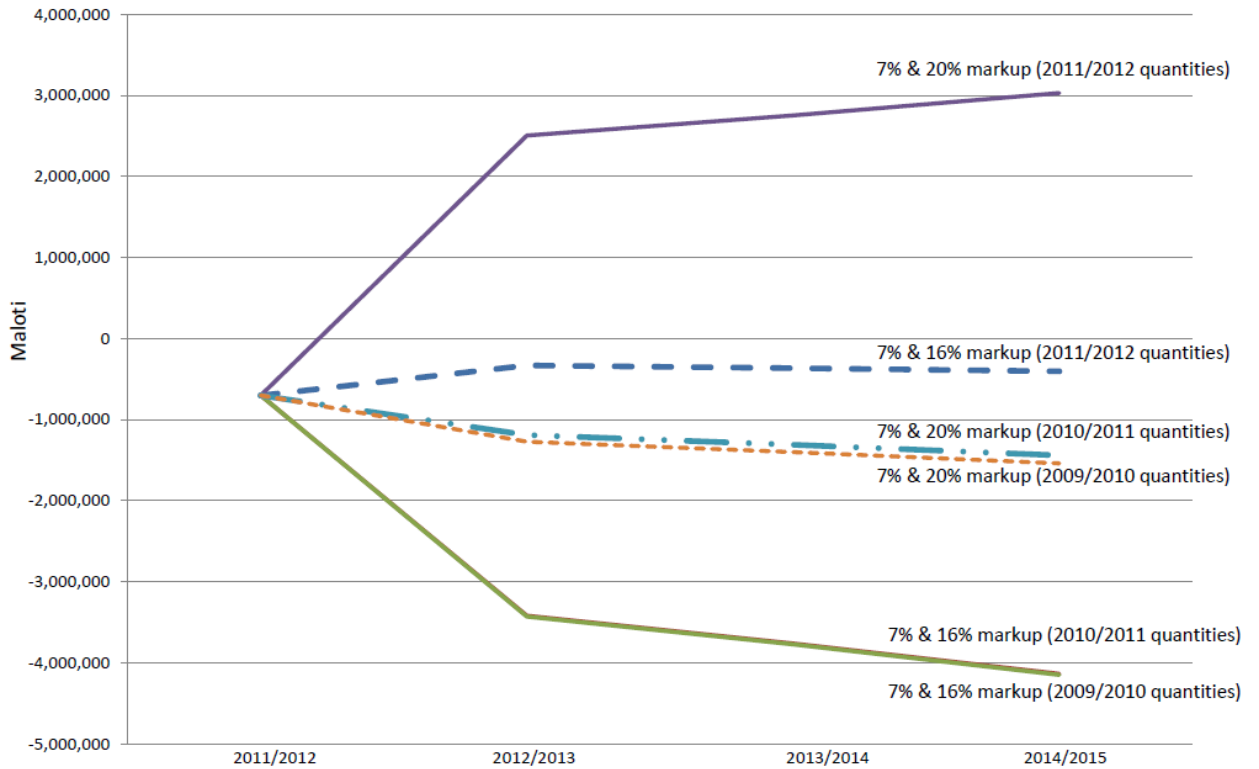
Figure 14 shows that, with an annual 5% increase in NDSO total costs, the 16% markup at FY 2011/2012 quantities may achieve profit at the end of the current financial year and in subsequent years, but this will not happen for FY 2010/2011 and FY 2009/2010 quantities in any year. There is very little difference in calculation results for the FY 2009/2010 and FY 2010/2011, and the two lines appear as a single line at the scale used in this graph. The 20% markup with FY 2011/2012 and FY 2010/2011 quantities projects profits, beginning with the current financial year, and for FY 2009/2010 quantities beginning ion FY 2013/2014.



Source: RxSolution data calculations.

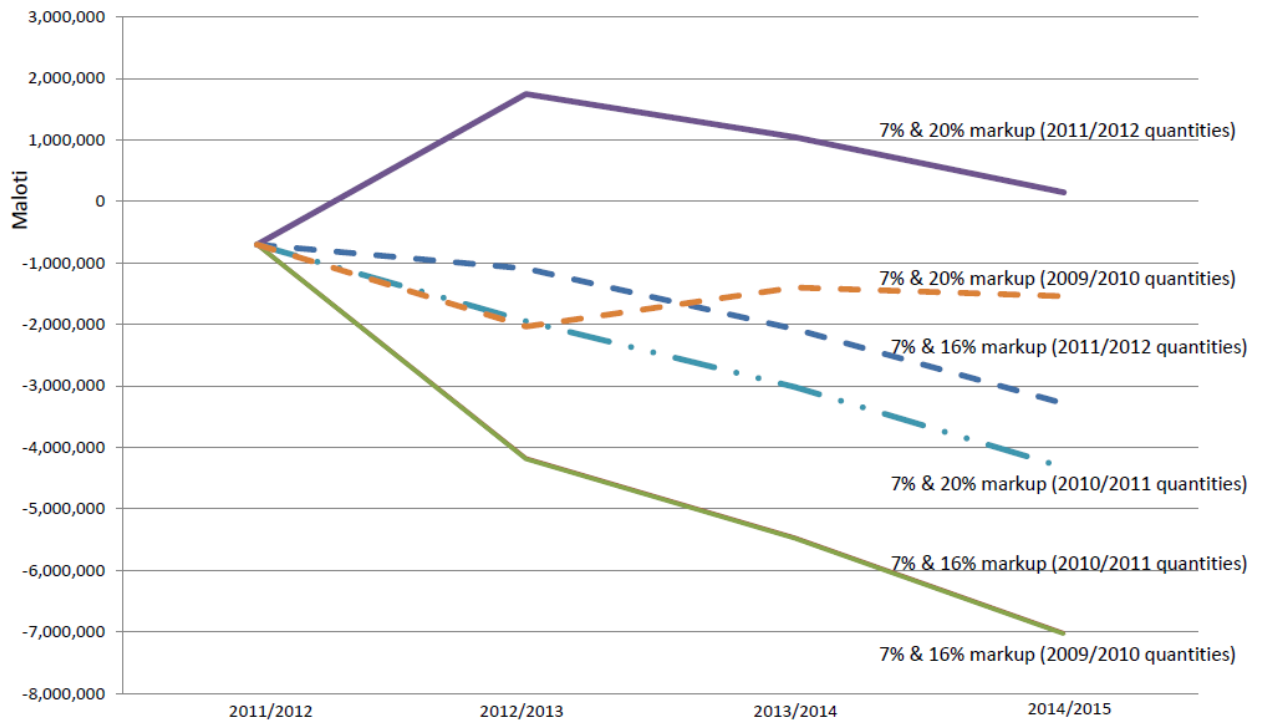
**Figure 14. Projection of profit or loss at selected markup scenarios and quantities at annual 5% NDSO total cost increase**

Figures 15 and 16 show that only a 20% markup will achieve profit if NDSO total costs increase annually by 10% or 15%.



Source: RxSolution data calculations.

**Figure 15. Projection of profit or loss at selected markup scenarios and quantities at annual 10% NDSO total cost increase**



Source: RxSolution data calculations.

**Figure 16. Projection of profit or loss at the selected markup scenarios and quantities at annual 15% NDSO total cost increase**

Tables 5 and 6 provide the projected income and NDSO cost data used to calculate the profit or loss in figures 14, 15, and 16. Calculations for 2011/12 correspond to data obtained from RxSolution and the financial statements. Projections for FY 2012/13, FY 2013/14, and FY 2014/15 are based on the assumptions stated previously for the two scenarios.

**Table 5. Income from 7% Markup of Donated Products and 20% Markup of Commercial Products**

<b>Income and costs (maloti)</b>	<b>Financial year</b>			
	<b>2011/2012</b>	<b>2012/2013</b>	<b>2013/2014</b>	<b>2014/2015</b>
Income (2011/12 quantities)	14,487,462	19,211,051	21,132,156	23,245,372
Income (2010/11 quantities)	14,487,462	15,517,250	17,068,975	18,775,872
Income (2009/10 quantities)	14,487,462	15,434,096	16,977,505	18,675,256
NDSO costs (15% annual increase)	15,188,521	17,466,799	20,086,819	23,099,842
NDSO costs (10% annual increase)	15,188,521	16,707,373	18,378,110	20,215,921
NDSO costs (5% annual increase)	15,188,521	15,947,947	16,745,344	17,582,612

*Sources:* RxSolution database; MSH calculations.

**Table 6. Income from 7% Markup of Donated Products and 16% Markup of Commercial Products**

<b>Income and costs (maloti)</b>	<b>Financial year</b>			
	<b>2011/2012</b>	<b>2012/2013</b>	<b>2013/2014</b>	<b>2014/2015</b>
Income (2011/12 quantities)	14,487,462	16,374,754	18,012,230	19,813,453
Income (2010/11 quantities)	14,487,462	13,289,401	14,618,341	16,080,175
Income (2009/10 quantities)	14,487,462	13,279,411	14,607,352	16,068,088
NDSO costs (15% annual increase)	15,188,521	17,466,799	20,086,819	23,099,842
NDSO costs (10% annual increase)	15,188,521	16,707,373	18,378,110	20,215,921
NDSO costs (5% annual increase)	15,188,521	15,947,947	16,745,344	17,582,612

*Sources:* RxSolution database; MSH calculations.

## CONCLUSIONS AND RECOMMENDATIONS

- Given the magnitude of accounts receivable and the possible downward trend in sales and income with resulting projected income lower than NDSO expenditures, as reported in FY 2011/12, it would be too soon to make any changes in the 20% markup, which has been in effect only one year. Lowering the markup would be risky for NDSO until it can be shown that (a) sales are stable or are steadily increasing over several years and (b) costs are effectively controlled and kept at or under a 5% annual increase. Once the markup is lowered below the existing 20%, raising it again will likely be more difficult without strong justification.
- NDSO expenditures must be closely monitored and controlled to identify appropriate measures to contain costs and increase efficiency. A more detailed analysis of the major cost elements, particularly staffing needs, may identify opportunities to lower costs.
- NDSO and the MOH should work together to identify a mechanism or strategy to optimize health facility budget management, as well as optimize payment mechanisms to ensure that health facilities order and receive sufficient quantities of needed medicines and other health supplies. There is a need to—
  - Develop and implement a mechanism, channels, and procedures for timely and effective communication of budget approval so that health facilities can make their supply orders on time and avoid shortages.
  - Manage the ordering and payment system for essential medicines and supplies the way it is done for ART supplies.
  - Advocate for and explore centralizing the invoicing for requested supplies to MOH and centralizing payment by MOH, but maintain decentralized ordering (by health facilities), drawing down on the budget allocated to them for medicines and other health supplies. A system of quarterly prepayment appears to have been in effect for a short time (2004–2007) but discontinued because the GOL was concerned with a perceived conflict of interest regarding NDSO because of the centralization of supplies payment linked to NDSO responsibility for raising the orders and for supplying medicines and dressings.
- NDSO has been operating with a net profit (surplus). With close expenditure (cost) monitoring and effective collection of accounts receivable, the funds that are currently available in the call accounts can be used for (a) enhancements in service, such as potential extension of distribution of supplies to additional delivery sites (health centers),<sup>17</sup> and (b) capital, infrastructure, and equipment improvements, if appropriate. NDSO intends to purchase land on which to build a warehouse, but the actual purchase has been delayed. Although a perceived need exists for more warehouse space, a formal assessment is advisable to determine whether maintaining (and renovating) currently available warehousing space, accompanied with procurement system modifications, or building additional warehouse space is better.

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<sup>17</sup> A proposed broader supply chain system analysis will analyze options to improve distribution of health supplies to health centers.



- Through the RxSolution system, data are available and accessible to monitor NDSO performance, and a core set of indicators, besides those that are reported in the annual financial statements, can be agreed upon and used for monitoring and reporting on NDSO performance.<sup>18</sup> These may be reported in consolidated indicator-based regular reports (quarterly or yearly, as appropriate). NDSO could use methodological approach, practical guidance materials, and knowledge and capacity gained from the current analysis as and when needed in future to conduct similar cost analyses to inform appropriate markup or handling fee decisions.
- NDSO is currently financially successful and self-sustaining. But NDSO's contribution to desirable health outcomes through effective supply of essential health commodities is apparently suboptimal. Only just over a third (37%) of the number of medicines and less than a third (20 to 30%) by value of NDSO supplies correspond to items that are on the Lesotho Essential Medicines List. In addition, although some of the underlying causes of health facility stock-outs and medicine availability are associated with lack of supply management capacity at health facility level, a greater NDSO focus and alignment with supply management of essential medicines and supplies may contribute to more effective and efficient health care services.
- This NDSO cost analysis should be followed by a more comprehensive, system-wide analysis to identify options for improving effectiveness and efficiency of the national supply chain system for essential health commodities.
- Although responsibility for procurement and distribution of laboratory supplies was nominally transferred to NDSO, not all laboratory supplies are actually managed by NDSO. The MOH Central Laboratory continues to use the MOH procurement department to purchase supplies with donor funds. The Central Laboratory also stores a significant amount of its procured laboratory supplies with improper organization and in unclean conditions in a former Queen II Hospital central laboratory building, which has severe infrastructural defects, is staffed by one person with no warehousing management training, and which houses unknown but likely significant quantities of expired, damaged laboratory products. This requires urgent attention and resolution.

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<sup>18</sup> Additional indicators would address procurement efficiency, service level, product quality, and others.

## GLOSSARY

The following compilation provides definitions for terms used in this report. Most of these are defined in Management Sciences for Health, *MDS3: Managing Access to Medicines and Health Technologies*.

**Accounts payable:** Money owed by an organization to its suppliers. It is recorded in the organization's balance sheet as a liability.

**Accounts receivable:** Money owed to an organization by its clients. It is recorded in the organization's balance sheet as an asset.

**Expense ratio:** Total operating expenses divided by net sales (or value of medicines distributed). In one view, the lower this ratio, the more efficiently services are being managed.

**Average inventory-holding cost:** The average cost of holding inventory as a percentage of average inventory value. In a public pharmaceutical supply system, 30 to 40% is a reasonable target.

Holding cost as a percentage of average inventory is calculated by dividing the total holding cost by the average inventory value and expressing the result as a percentage. In commercial firms, the inventory-holding cost is usually between 25 and 35% of average inventory value; in a public pharmaceutical supply system, the percentage may be considerably higher, although it need not be with good inventory management.

**Average inventory turnover:** The total value of medicines purchased or distributed, divided by the average inventory value.

**Inventory holding costs:** Total holding cost as a percentage of the value of medicines distributed or the value of receipts, giving an indication of the cost-effectiveness of maintaining in-house services rather than contracting out some or all aspects of storage and distribution. A variation of this ration is total cost to value of medicines distributed or received.

**Inventory shrinkage:** The sum of beginning inventory value plus purchases, minus the sum of the cost of goods sold, plus ending inventory value. Ideally this figure would be zero, but any value less than 10% of inventory value is within expectation in most public pharmaceutical supply systems.

**Inventory turnover (also called net sales to inventory):** The total value of medicines distributed, minus the write-offs, divided by the value of the inventory. The higher the ratio is, the lower is the average inventory level (and average holding cost). Most private companies would expect a turnover ratio of 12 or higher; in public pharmaceuticals supply systems, the ratio is dictated to some extent by the purchasing model, but a ratio of at least 6 is realistic in most cases.

**Markup:** The amount added by a seller to the cost of a commodity to cover expenses and profit in fixing the selling price; it is calculated by the difference between the cost price and the selling price, computed as a percentage of either the selling price or the cost price.

**Service level:** The percentage of items ordered or requests that is filled from stock by the supplier or warehouse. From the public health viewpoint, the higher the service level is, the better, as long as inventory costs do not rise to insupportable levels.

**Surplus:** Excess of revenues over expenditures during a particular period.

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